RF/ER-96-0010

Interagency Agreement Underground Storage Tank Source Removal Program Sampling and Analysis Plan

Final

Rocky Mountain Remediation Services, L.L.C.

March 1996

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

BNA . . . . Base/Neutral/Acid
COC . . . . Chain of Custody
DMP . . . . Data Management Plan
DOE . . . . Department of Energy
EPA . . . . Environmental Protection Agency
GRRASP . . . . General Radiochemistry and Routine Analytical Services Protocol
HASP . . . . Health and Safety Plan
IHSS . . . . Individual Hazardous Substance Site
LLW . . . . Low Level Waste
OU . . . . Operable Unit
pCi/g . . . . Picocuries per gram
pCi/l . . . . Picocuries per liter
QAA . . . . Quality Assurance Addendum
QA/QC . . . . Quality Assurance/Quality Control
RCRA . . . . Resource Conservation and Recovery Act
RFETS . . . . Rocky Flats Environmental Technology Site
RFI/RI . . . . RCRA Facility Investigation/Remedial Investigation
RMRS . . . . Rocky Mountain Remediation Services, L.L.C
SAP . . . . Sampling and Analysis Plan
SVOA . . . . Semi-Volatile Organic Analysis
SVOC . . . . Semi-Volatile Organic Compound
TCLP . . . . Toxicity Characteristic Leaching Procedure
µCi/g . . . . Microcuries per gram
µCi/l . . . . Microcuries per liter
VOA . . . . Volatile organic analysis
VOC . . . . Volatile organic compound
WAC . . . . Waste acceptance criteria

LIST OF STANDARD OPERATING PROCEDURES (SOPs)

IDENTIFICATION NUMBER	PROCEDURE TITLE
L-6245-F	*Sample Procedures for Waste Characterization*
L-6294-A	*Waste Characterization Sampling Procedure Inside the Protected Area*

General Radiochemistry and Routine Analytical Services Protocol, Part A and B (GRRASP, 1991)

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) describes the specific analytical needs, verification, and waste characterization sampling requirements, sampling disposition, data handling requirements, data quality objectives (DQOs), and quality assurance/quality control (QA/QC) required for the IAG Underground Storage Tank (UST) Source Removal Project at the Rocky Flats Environmental Technology Site (RFETS).

The IAG USTs have been selected for accelerated remedial actions based on potential risk to human health and/or the environment. The risk analysis was performed using analytical results from samples collected in support of *Technical Memorandum No. 1, Addendum to the Phase I RFI/RI Work Plan, Operable Unit No. 9, Original Process Waste Lines* (DOE, 1994).

The scope of the IAG UST Source Removal Project includes the removal of residuals including liquids and sludges from seven tanks (T2/3, T-10E, T-10W, T-14, T16N T16S, and T-40) located at four sites – Buildings 441, 730, 889, and 774. Figures 1-1 through 1-4 provide locations of the tanks. The tanks will be rinsed out with potable water and rinsate samples will be collected following each rinse. The tanks will be filled with a closed-cell foam material following the final rinsing effort. This action is being conducted in compliance with the *Accelerated Action Plan for Interagency Agreement Underground Storage Tanks Containing RCRA-Regulated Materials* (Kaiser-Hill, 1995). Foaming activities are addressed in the *Draft Proposed Action Memorandum for Contaminant Stabilization of Underground Storage Tanks* (RMRS, 1996).

This action assumes that: (1) Tank 2 and Tank 40 are breached and contain groundwater; (2) Tanks 10 East and West, Tank 14 and Tanks 16 North and South contain process wastes; (3) sludges may be present in Tanks 2/3, Tank 10 West, and Tank 40 and require waste characterization; (4) the sites are located within individual hazardous substance sites (IHSS); and (5) the contaminated media and wastes generated from this action are to be treated or stored on site. This SAP provides the methodology for implementing the sampling associated with the source removal action.

1.1 BACKGROUND

Operable Unit (OU) 9, Original Process Waste Lines, consists of 40 tank locations and approximately 35,000 feet of pipeline. A portion of the OU 9 RCRA [Resource Conservation and Recovery Act] Facility Investigation/Remedial Investigation (RFI/RI) was conducted as part of the RCRA corrective action. To expedite the RFI/RI, the first stage (Stage 1) of the investigation was divided into three parts: (1) tanks outside large buildings; (2) tanks inside large buildings; and (3) pipelines. The field investigation of tanks outside large buildings was completed and the data was evaluated, and each tank site (or IHSS) was ranked according to risk to human health and the environment. A prioritized list of RFETS's IHSSs was developed to select the top priority IHSSs (or portions of IHSSs) for remediation. The ranking was completed according to the *Environmental Restoration Ranking Document* (RMRS, 1995). All four of the tank sites were ranked in the top 20 sites of the prioritization list. Four of the six tank sites (T-14, T-10, T-16, and T-2/3) were ranked in the top five sites.

Tanks 2 and 3 are located north of Building 449 and comprise IHSS 122 in OU 13. The tank(s) consists of a wet well, limestone bed, and 6,000-gallon holding tank. A portion of the holding tank is overlain by a pump vault and a head chamber. Building 441 was remodeled in the 1960s, and a portion of the building was constructed above the wet well and approximately one half of the limestone bed. The Tank 10 site is located north of Building 776. Tank 10 includes two 4,500-gallon tanks. Tank 14 is a 30,000-gallon process waste tank west of and adjacent to Building 774. Tank 16 site is composed of two 14,000-gallon process waste tanks and is also located west of and adjacent to Building 774. The Tank 16 site is located north of Tank 14. Tank 40 is located west of Building 889. Two 1,000-gallon tanks and a vault comprise Tank 40. The tanks and a portion of the vault are filled with groundwater.

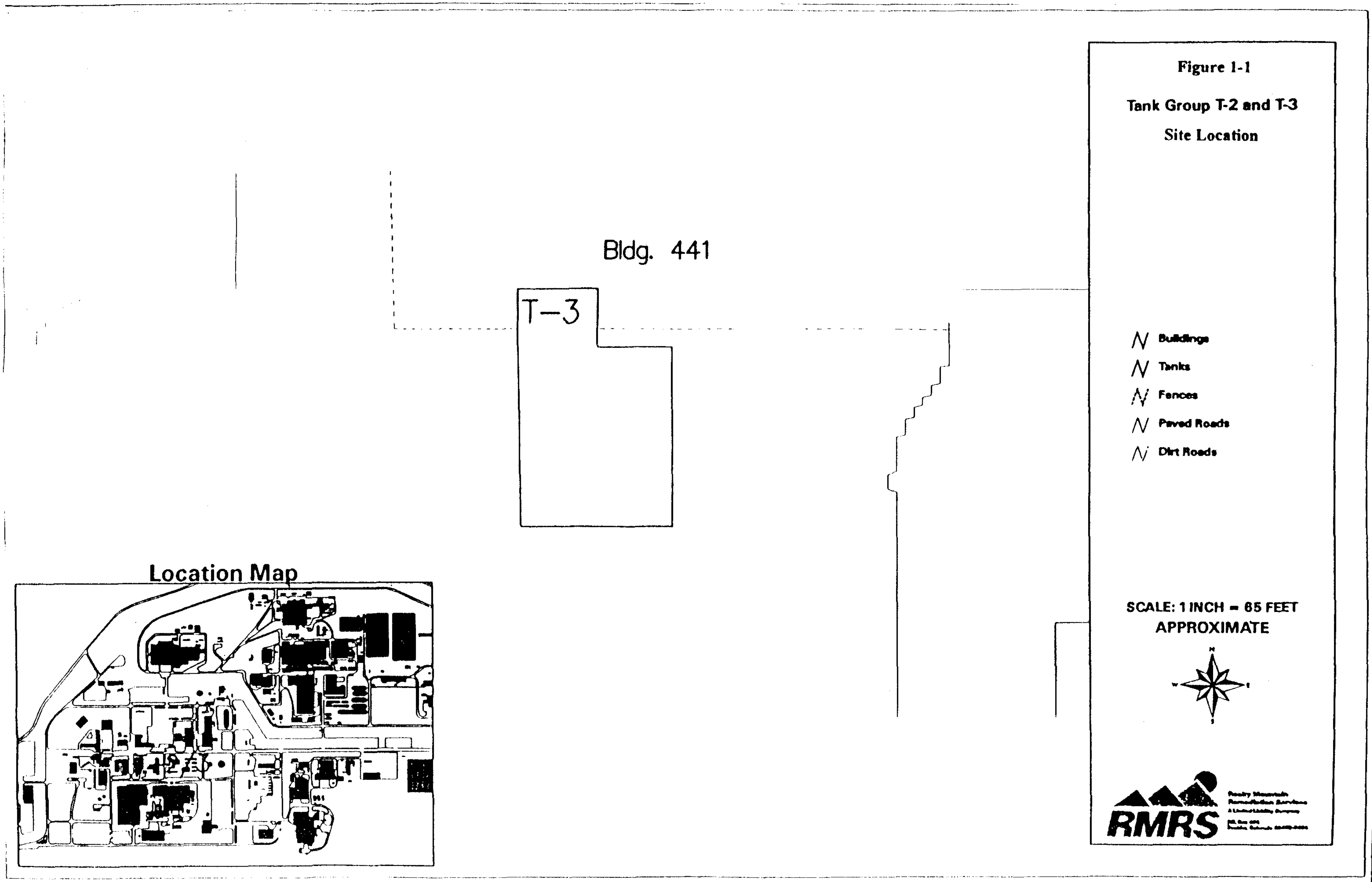


Figure 1-1

Tank Group T-2 and T-3

Site Location

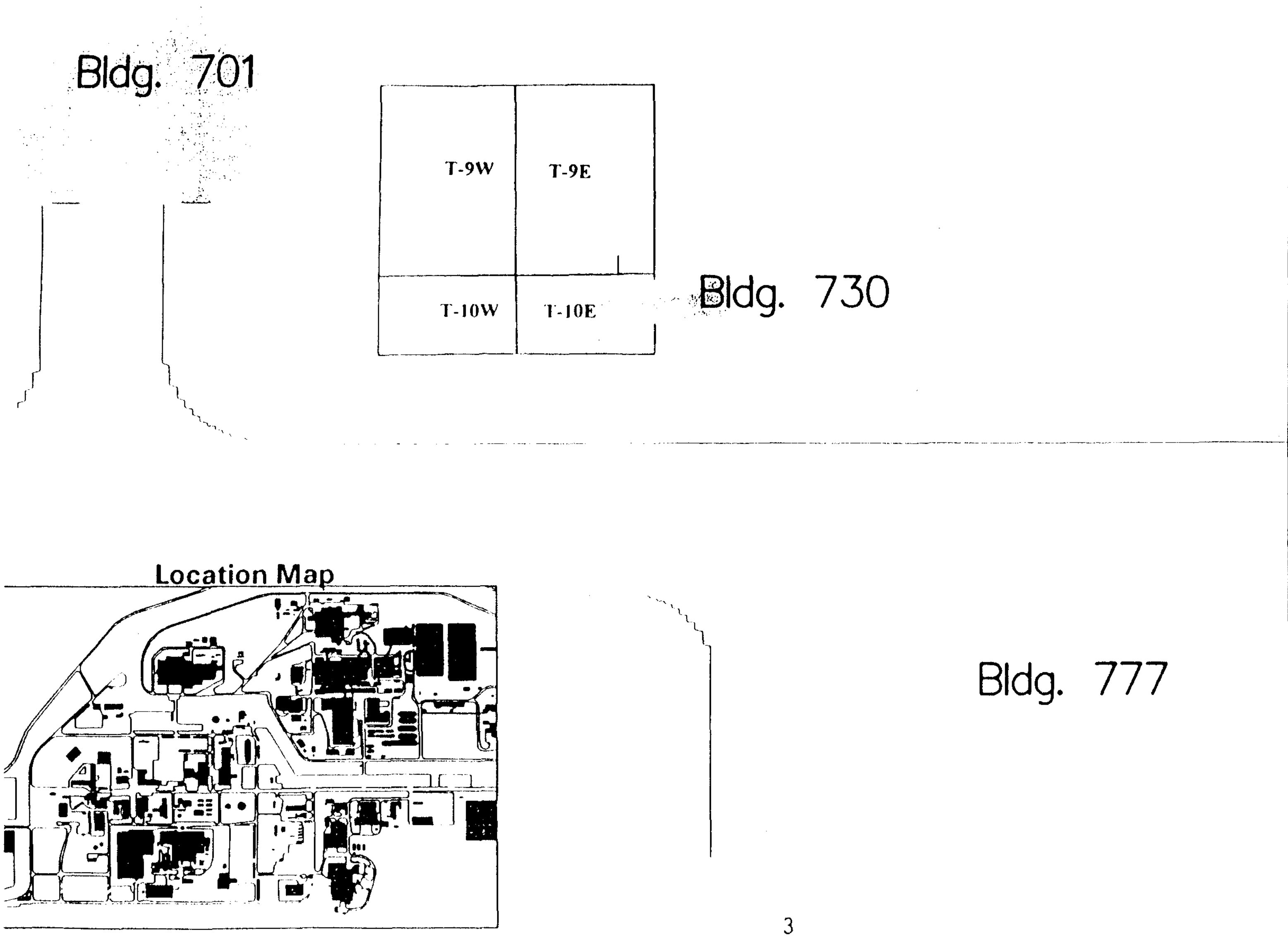


Figure 1-2

Tank Group T-9 and T-10

Site Location

Buildings
Tanks
Fences
Paved Roads
Dirt Roads

SCALE: 1 INCH = 116 FEET
APPROXIMATE

RMRS

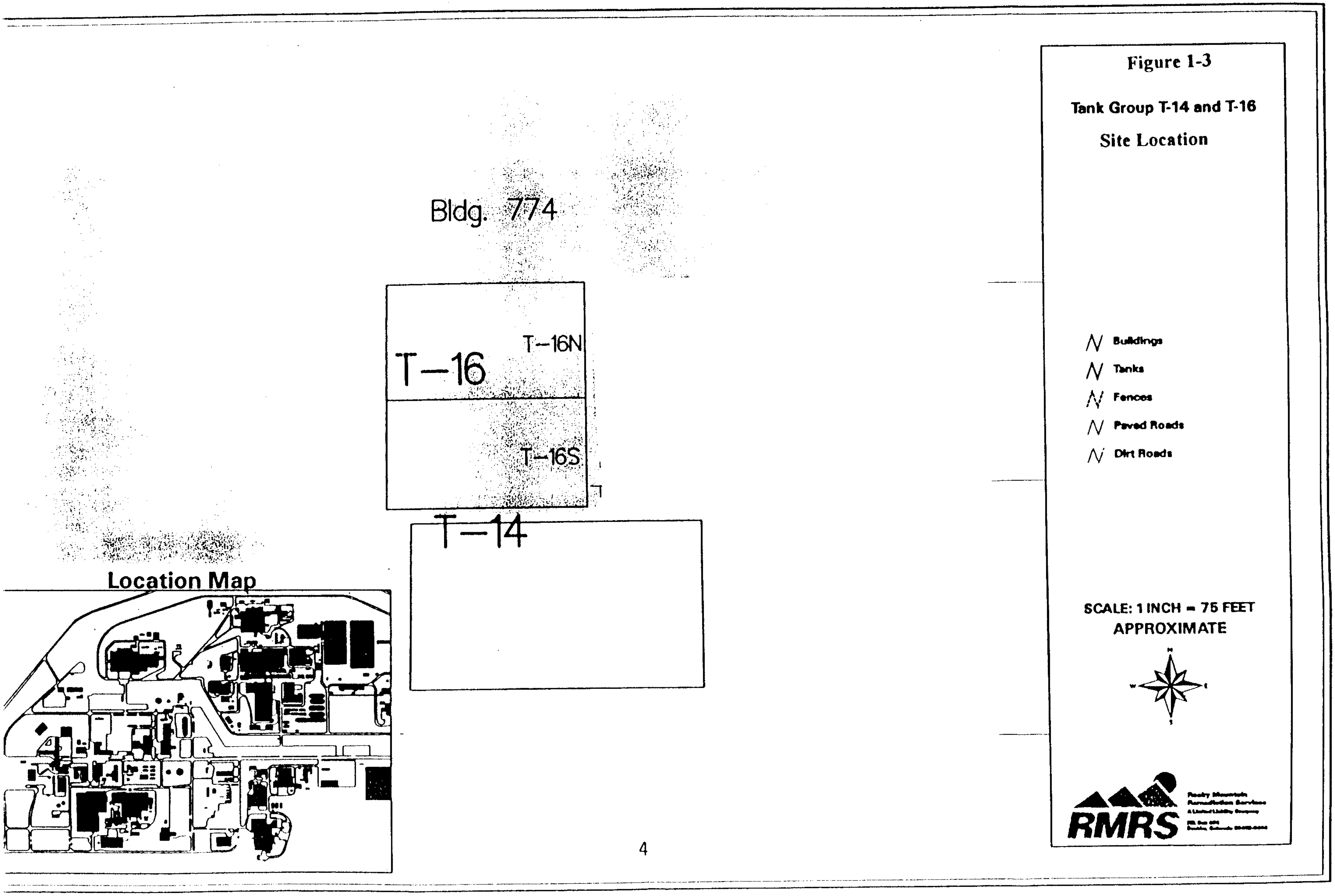


Figure 1-3
Tank Group T-14 and T-16
Site Location
Buildings
Tanks
Fences
Paved Roads
Dirt Roads
SCALE: 1 INCH = 75 FEET
APPROXIMATE
RMRS
Bldg. 774
T-16
T-16N
T-16S
T-14
Location Map

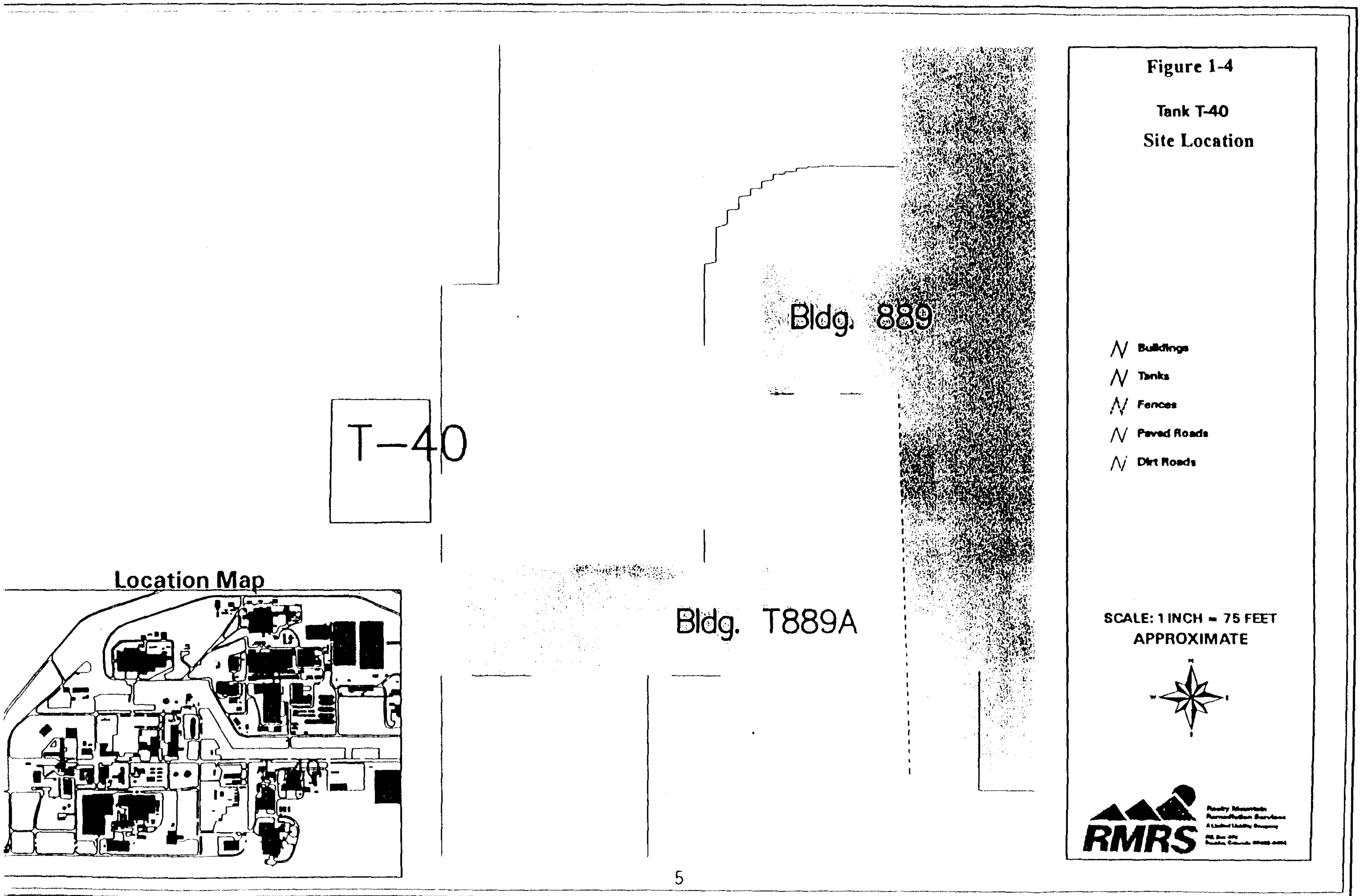


Figure 1-4
Tank T-40
Site Location

1.2 SUMMARY OF THE SOURCE REMOVAL ACTION

The proposed action includes the following activities:

- Removal of residual materials including sludges and liquids remaining in the tanks;
- Collecting samples of previously uncharacterized sludges and intermediate and final rinsates;
- Treatment of tank residue (liquids/sludges);
- Containerization of sludges and temporarily storing waste prior to treatment/disposal;
- Rinsing the interior of the tanks; and
- Filling tanks with a closed-cell foam.

The sampling activities required to support these actions include:

- Sampling of previously uncharacterized sludges, if encountered, to determine waste disposal options;
- Rinsate sampling to document the effectiveness of the rinsing process; and
- Final rinsate sampling to document quality of final rinse waters to determine tank closure alternatives.

2.0 OBJECTIVE AND SCOPE

The objective of this SAP is to identify the specific analytical needs, sampling requirements, data handling requirements, and associated QA/QC requirements for completion of source removals from the IAG USTs. More specifically, this includes the completion of one or more of the following objectives:

- To determine the effectiveness of the cleaning/rinsing methodology;
- To generate adequate and defensible information to characterize the rinsate and final rinsate waters removed from the USTs; and
- To characterize sludges and liquid wastes generated from this removal action.

It should be noted that these actions may not remove all residuals. The objectives of this action is to remove contamination at the source, i.e., from the tanks, and rinse the tanks using a high pressure wash. Rinsate samples will then be collected from the tanks to document the effectiveness of the rinsing process. The water used for this effort will be a potable water source (such as firewater).

Based on the objectives described above, the scope and contents of this SAP will include:

- Appropriate sampling methods;
- Identifying the frequency, sequence, and number of samples to be taken;
- Describing the analytical requirements and appropriate sampling methods;
- QA/QC requirements including data quality objectives; and
- Generating adequate information for characterization, storage and/or disposal purposes.

3.0 SAMPLING APPROACH AND REQUIREMENTS

The planned source removal action will consist of pumping/removal of tank liquids and sludges. The source removal will be conducted by trained Rocky Flats Environmental Technology Site Liquid Waste Operations staff equipped with appropriate personal protective equipment defined by the Integrated Work Control Package. The action will be conducted using hand tools and pumps.

The tanks currently contain liquids (process wastes and/or groundwater). Tanks 10, 14, and 16 are also known to contain sludges. The first removal activity will be to pump existing liquids from the tanks to allow sludge removal activities. Liquids will be pumped to a tanker or through a pipeline to an appropriate onsite treatment facility (Buildings 374, 774, 891). Liquids have previously been sampled and analyzed, results are provided in the *OU No. 9 Draft Summary 2, Operable Unit No. 9, Outside Tanks* (DOE, 1995). Sludges have been characterized for Tanks T-10 East, Tank T-14 and Tanks T-16 North and South. If Tank T-2, Tank-10 West and Tank 40 are determined to contain sludges, the sludges will be sampled prior to or following containerization. The timing of the sampling event will be determined in the field based on the actual quantities and containerization requirements. However, the samples will be collected as soon as possible following the detection of sludges. Tank 10 sludges may be re-suspended and pumped via a constructed pipeline to Building 774.

The removal action will require a four-step approach for sludge, water, and rinsate sampling. The first step will be to collect sludge samples, if required, of previously uncharacterized sludges for waste acceptance criteria parameters. The sludges and liquids may be sampled in situ or after being placed in a new waste container. The second sampling step is to obtain samples of the source water to be used in the final rinsing of the tanks. The purpose of this sample is to determine a baseline quality of waters used in the rinsing process.

The third set of samples to be collected include a sample of waters generated from each rinsing effort. The samples will be submitted to the onsite laboratory for screening purposes. The purpose of these screening samples is to determine the effectiveness of the rinsing by determining the quality of water following each effort. The results of the most recent sampling effort will be compared to the previous sampling results to determine if the rinsing effort is effective. If no appreciative decrease (30%) in target parameters is realized, the rinsing effort will be considered complete. A minimum of three rinsing efforts will be performed for each tank. Rinsate waters introduced and removed from the tanks during each rinsing effort will be visually monitored and recorded in the field log book to determine if rinsates are recovered and controlled.

The fourth (final) sample to be collected will consist of water generated during the final rinsate. The final rinsate sample will be collected for definitive data analysis. This sample will be used to document the effectiveness of the rinsing process by determining the quality of the final rinsate water. The sample may be collected following the third rinse effort in anticipation that the third rinse was effective. If the screening sample results indicate that the rinse effort was not successful, the samples will be discarded and the tank will be rinsed again, and the screening and final rinsing efforts will be conducted again until the 30% decrease in target levels are met. However, the Project Manager may suspend rinsing efforts if a point of diminishing returns is reached.

3.1 COLLECTION OF SLUDGE SAMPLES

Field sampling personnel will collect additional samples of sludges, liquids and/or samples of previously uncharacterized sludges (if encountered) for waste characterization purposes. These samples will be analyzed for parameters provided in Table 3-1. Sludges have not been encountered in Tanks 2 and 3, Tank 40, or Tank 10 West. The samples of sludge will be collected using the RFETS procedure L-6294A, *Sample Procedure for Waste Characterization*. The volatile organic compound (VOC) samples will be collected as discrete grab samples (not composited). The samples may be collected in situ or following containerization or packaging depending on field conditions.

3.2 COLLECTION OF RINSE WATER SAMPLE

A sample will be collected from the discharge of the pressure washer prior to the rinse effort to establish a water quality baseline of the potable water used for the final rinsing process. The quality of the rinse water may be impacted from transporting the water to the tank site by the water hose used or from residuals in a tank. One sample will be collected per water delivery mechanism for the project. For example, if potable water is delivered to the site by a tanker truck, one sample will be collected to baseline the tanker water quality. If water is delivered by a water hose (fire hydrant), a sample will be collected to establish the water quality baseline from the hose. If the water hose is changed or replaced during the project, an additional sample will be collected. The sampling suite will consist of characteristic leaching procedure (CLP) analytical parameters identical to the final rinsate program for VOCs, semi-VOCs, total metals, and radionuclides. Table 3-1 provides the analytical program for the sample of the rinse water source.

3.3 COLLECTION OF RINSATE SAMPLES

Rinsate samples will be collected of water generated from rinsing of the tank to document the effectiveness of the rinsing process. Rinsate samples will not be collected following the initial sludge removal and first rinsing of the tank. To clarify, the first rinse water generated from the tank will most likely be used to mobilize sludges not removed during the gross sludge removal process. This rinse water will not be sampled. However, subsequent water generated from rinsing the tanks will be collected and analyzed for screening purposes. Rinsate samples will be submitted for metals and VOC sweeps only. The sweep is an analytical method that will provide acceptable detection limits and quick laboratory turnaround. The results will be used to guide field personnel during the rinsing effort. Table 3-1 presents the analytical program for rinsate samples.

3.4 COLLECTION OF FINAL RINSATE SAMPLES

Samples of the final rinsate will be collected for laboratory analysis to document rinse water quality following the completion of rinsing activities and prior to the foaming of the tanks. The final rinse sample will be collected following confirmation the rinsing effort has been effective. The final rinsate samples will be collected for VOCs, semi-VOCs, metals, and radioanalytical parameters. Table 3-1 provides the analytical program for final rinsate samples.

3.5 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

The collection of all samples will be in accordance with appropriate procedures. The collection of samples will follow Procedure L-6245-F, Section 6.1, *Method of Collection/Sampling Equipment*, or L6294-A, *Waste Characterization Sampling Procedures Inside the Protected Area*. Radioactive screening of samples will be performed according to Section 6.4.4 of Procedure L-6245-F or L6294-A for all samples collected in support of this program.

Tables 3-2 and 3-3 present sample containers, preservation and handling requirements for sludge and rinsate (liquid) samples, respectively.

3.6 QUALITY CONTROL

Field sampling quality control will be conducted for definitive sampling only (blank and final rinse samples) and will consist of the following:

- Collection of field duplicate samples will be at a minimum of one per 20 samples or a minimum of one duplicate sample every three tanks;
- Preparation and analysis of an equipment rinsate blank for every 20 samples collected (at a minimum or at least one rinsate blank if 20 samples are not collected); and
- Trip blanks for VOC analysis at a frequency of a VOC trip blank per shipment.

3.7 DECONTAMINATION OF SAMPLING EQUIPMENT

All sampling equipment will be decontaminated prior to and following the collection of sludge and water samples according to Procedure L-6245-F, Section 6.2.2, *Equipment Decontamination*. Decontamination procedures for sampling equipment is included in Procedure L-6245-F, *Sampling Procedure for Waste Characterization* or L6294A, *Waste Characterization Sampling Procedure Inside the Protected Area*. Decontamination activities will be documented in maintenance (field) log books in accordance to Procedure L-6245-F, Section 8, *Records*.

3.8 PERSONNEL HEALTH AND SAFETY

Project personnel will adhere to the Integrated Operable Units 8, 9, 10, 13, and 14 Phase I RFI/RI Final Health and Safety Plan (HASP) and the project's activity hazard analysis/preliminary hazard analysis (AHA/PHA).

4.0 ANALYTICAL REQUIREMENTS

The analytical specifications for this project will follow the protocol described in the *General Radiochemistry and Routine Analytical Services Protocol* (GRRASP) (EG&G, 1993). The GRRASP describes the protocol for analytical methods that will be used, detection limits, holding times, laboratory chain of custody, extraction/preparation criteria, and reporting requirements.

4.1 DATA NEEDS

The data needs for this project include the collection of sufficient information of adequate quality to meet the specific objectives of the project. As described above, this includes characterization of the sludge materials for RCRA constituents, requirements for Land Disposal Restriction (LDR) criteria, and determining the radiological classification of waste as a Low Level Waste (LLW) or Transuranic Waste (TRU). The quality requirements for the removal action are described in the data quality objectives section of Appendix B, Quality Assurance Addendum (QAA).

4.2 ANALYTICAL METHODS

The analytical methods that will be used to support the DQOs of the IAG Tank Source Removal Project can be found in Table 3-1.

5.0 DATA MANAGEMENT REQUIREMENTS

The specific data management requirements for this SAP are defined and described in the Appendix A, Data Management Plan (DMP). This DMP will be followed for all data collection, compilation, and dissemination activities for this project.

6.0 QUALITY ASSURANCE/QUALITY CONTROL

The specific Quality Assurance/Quality Control requirements for this SAP are defined and described in the QAA. This QAA will be followed for all QA/QC activities for this project.

7.0 REFERENCES

DOE, 1994. Technical Memorandum No. 1, Addendum to the Operable Unit No. 9 – Original Process Waste Lines Phase I RFI/RI Work Plan, Field Sampling Plan, Volume I, Part A – Outside Tanks. Environmental Restoration Program.

DOE, 1995. OU No. 9 Draft Summary 2, Operable Unit No. 9, Outside Tanks. Environmental Restoration Projects.

DOE, 1996. Draft Proposed Action Memorandum for Contaminant Stabilization of Underground Storage Tanks (RMRS, 1996)

EG&G, 1993. General Radiochemistry and Routine Analytical Services Protocol (GRRASP).

EPA, 1986 (Revised Sept. 1994). Test Methods for Evaluating Solid Waste: Physical/Chemical Methods; Third Edition (SW-846).

Kaiser-Hill, 1995. Accelerated Action Plan for Interagency Agreement, Underground Storage Tanks Containing RCRA-Regulated Materials. Environmental Restoration, Waste Management and Integration.

RMRS, 1995. Environmental Restoration Ranking. Environmental Restoration/Waste Management.

TABLE 3-1 IAG UST ANALYTICAL PROGRAM

Analysis	Method	Sludge	Rinsate	Rinse Water Blank	Final Rinsate
Radioanalytical Screen; Gross Alpha and Gross Beta	Gas Proportional Counting	X	X		X
Gross Alpha and Gross Beta	Gas Proportional Counting	X		X	X
Plutonium 239/240 Americium 241 Uranium Isotopes	Alpha Spectrometry	X		X	X
VOCs	EPA Method 8240	X		X	X
Semi-VOCs	EPA Method 8270	X		X	X
Total Metals[1]	SW-846 Methods	X		X	X
Metals Sweep (ICPES analytes and Hg)	ICPES-Method 200.7 CLP-M CVAA-Method 245.1 or Method 245.2 CLP-M (Modified)[2]		X		
VOC Sweep	EPA Method 8240 (Modified)[3]		X		
PCBs[4]	EPA Method 8081/505	X			X
Field Parameters; pH, Conductivity, Temperature	Ion Specific Probe		X	X	X
Fingerprint Appearance pH Ignitability Specific gravity	 L-6220 L-6220 L-6272 L-6220	X			

[1]CLP-TAL analytes and CLP-TAL detection limits.

[2]Modified to meet DQO of screening samples. Required quality control samples are limited to instrument calibration, preparation blank, independent calibration verification, and continuing calibration checks. Instrument detection limits for arsenic, lead, and selenium will be those achieved by ICPES.

[3]Modified to meet DQO of screening samples. Matrix spikes, matrix spike duplicates will not be required.

[4]Tank 2/3 only.

TABLE 3-2 SLUDGE SAMPLE CONTAINERS, PRESERVATION, AND HANDLING

Analyte	Matrix	Analytical Method	Container	Preservative	Holding Time
Gross Alpha Gross Beta (Rad Screen)	Solid	Gas Proportional Counting	20-ml glass jar	None	6 months
Gross Alpha Gross Beta	Solid	Gas Proportional Counting	Follow Table 3-3-for mostly liquid 250-ml polyethylene-for mostly solid 60-ml polyethylene-for solid	None	6 months
Plutonium 239/240, Americium 241, Uranium Isotopes	Solid	Alpha Spectrometry/ Gamma Spectrometry	500-ml wide-mouth glass jar	None	6 months
Total Metals[1] (TAL Analytes)	Solid	EPA Methods: 6010 (ICP) 7000 Series (AA), 7471 (CV)	120-ml wide-mouth glass jar with Teflon-lined lid closure	Cool, 4° C	6 months, except mercury – 28 days
VOCs	Solid	EPA Method 8240	120-ml wide-mouth glass jar with Teflon-lined lid closure	Cool, 4° C	14 days
SVOCs	Solid	EPA Method 8270	120-ml wide-mouth glass jar with Teflon-lined lid closure	Cool, 4° C	14 days until extraction, 40 days after extraction
PCBs[2]	Solid	EPA Method 8081	60-ml wide-mouth glass jar with Teflon-lined lid closure	Cool, 4° C	14 days until extraction, 40 days after extraction
Fingerprint Appearance pH Ignitability Specific gravity	 Liquid Liquid Liquid Liquid	 L-6220 L-6220 L-6272 L-6220	200-ml glass jar	None	None

[1]CLP-TAL analytes and CLP-TAL detection limits.
[2]Tank 2/3 only.

TABLE 3-3 RINSATE SAMPLE CONTAINERS, PRESERVATION, AND HANDLING

Analyte	Matrix	Analytical Method	Container	Preservative[5]	Holding Time
Gross Alpha Gross Beta (Rad Screen)	Liquid	Gas Proportional Counting	20-ml glass container	Nitric acid pH <2 Cool, 4° C	6 months
Gross Alpha Gross Beta	Liquid	Gas Proportional Counting	1-L polyethylene container	Nitric acid pH <2 Cool, 4° C	6 months
Plutonium 239/204, Americium 241, Uranium Isotopes	Liquid	Alpha Spectrometry/ Gamma Spectrometry	1 four-liter (1-gal) polyethylene containers	Nitric acid pH <2 Cool, 4° C	6 months
Metals Screen (ICPES analytes and Hg)	Liquid	ICPES-Method 200.7 CLP-M CVAA-Method 245.1 or Method 245.2 CLP-M (Modified)[2]	1 one-liter polyethylene bottle	Nitric acid pH <2 Cool, 4° C	6 months, except mercury – 28 days
Total Metals[1]	Liquid	SW-846 Methods	1 one-liter polyethylene bottle	Nitric acid pH <2 Cool, 4° C	6 months, except mercury – 28 days
VOCs	Liquid	EPA Method 8240	40-ml VOA vials with Teflon-lined septum lids	HCl pH < 2, Cool 4° C	14 days
VOC Sweep	Liquid	EPA Method 8240 (Modified)[3]	40-ml VOA vials with Teflon-lined septum lids	HCl pH < 2, Cool 4° C	14 days
Semi-VOCs	Liquid	EPA Method 8270	2 one-liter amber glass bottles with Teflon-lined lid closure	Cool 4° C	7 days until extraction, 40 days after extraction
PCBs[4]	Liquid	EPA Method 8081/505	40-ml amber glass bottles with Teflon-lined lid closure	Cool 4° C	7 days until extraction, 40 days after extraction

[1]CLP-TAL analytes and CLP-TAL detection limits.

[2]Modified to meet DQO of screening samples. Required quality control samples are limited to instrument calibration, preparation blank, independent calibration verification, and continuing calibration checks. Instrument detection limits for arsenic, lead, and selenium will be those achieved by ICPES.

[3]Modified to meet DQO of screening samples. Matrix spikes, matrix spike duplicates will not be required.

[4]Tank 2/3 only.

[5]If free phase organic substances (NAPLS) are detected, preserve by chilling only.

RF/ER-96-0010

Interagency Agreement
Underground Storage Tank
Source Removal Program
Appendix A – Data Management Plan

Final

Rocky Mountain Remediation Services, L.L.C.

March 1996

TABLE OF CONTENTS

SECTION **PAGE**

LIST OF FIGURES

1.0 INTRODUCTION

The purpose of this Data Management Plan (DMP) is to support the Sampling and Analysis Plan for the IAG Underground Storage Tank (UST) Source Removal Project and to identify the mechanisms and procedures for the efficient and accurate transfer of data from collection/generation of the data through its end use. This is achieved by identifying the sources of data, establishing systematic procedures for quality assurance/quality control, and creating a suitable database to allow end users the appropriate access to meet project requirements and to establish appropriate security and back-up measures to ensure data integrity. The DMP identifies the procedures that define sample documentation, sample tracking, data entry, data proofing, data reporting, and data management personnel responsibilities.

The IAG UST Source Removal Project will involve the collection and analysis of data from several sources:

- Sludge sampling for waste characterization purposes,
- Sampling of waters generated from rinsing efforts of the tanks; and
- Sampling of the waters generated from the final rinsing effort.

This DMP has been developed to promote the proper and complete management of scientific and technical data that will be generated from the IAG UST Source Removal Project. The primary purpose of a DMP is to communicate to personnel collecting, using, and managing information procedures describing how this information will be recorded, stored, accessed, and reviewed. Procedures are defined and implemented to ensure that data are collected, entered, and stored in a secure, controlled, and retrievable manner to accurately and efficiently transfer data into useful information. This plan addresses the planning, implementation, and responsibilities to optimize data management and use of the Rocky Flats Environmental Database System (RFEDS) and the interim database, Datacap.

This DMP focuses principally on the data management and data handling. A detailed discussion of peripheral activities (i.e., field data collection methods) is described in the main portion of the Sampling and Analysis Plan (SAP). RFEDS will be the ultimate repository for all data generated during this project.

2.0 RESPONSIBILITIES AND QUALIFICATIONS

Support staff for the data management tasks includes all personnel involved in data acquisition, quality control, and data processing. The designated staff are responsible for implementing and carrying out data management activities according to this plan. Figure 2.0 provides a functional organizational chart for the Sample Management activities for the project.

The primary personnel responsible for data management are the RMRS Team Leader, Sample Crew Personnel, Sample Manager, Qualified Technical Reviewer, Field Data Manager, RFEDS User System Manager (USM), Data Verifier and Project QA/QC Officer. The responsibilities for these positions are summarized in the following sections.

2.1 RMRS TEAM LEADER

The RMRS Team Leader will be responsible for ensuring that all data are collected, processed, and stored in a manner consistent with this DMP and in compliance with procedure 5-21000-OPS-FO.14, *Field Data Management*. Data management support personnel will report to the RMRS Team Leader any problems that may impact the integrity of the data and/or the removal action.

Prior to sample collection, the RMRS Team Leader will:

- Coordinate sample shipping with a RFETS Laboratory, or other approved analytical laboratory;
- Coordinate the overall field effort;
- Obtain RFEDS assigned sample numbers and location codes from the RFEDS USM to use on the Chain of Custody (COC) forms;
- Ensure assigned sample numbers are used on the proper sample bottles; and
- Ensure laboratory's capability to upload data into RFEDS system.

After sample collection, the RMRS Team Leader will:

- Manage any feedback from the laboratory;
- Ensure that any data from sample locations that have been surveyed are given to the RFEDS GIS group; and
- Ensure that the appropriate authenticated quality-related records and Administrative Records are transmitted to the Central Records Center.

2.2 PROJECT QA/QC OFFICER

The Project QA/QC Officer will ensure that procedures are carried out in accordance with the SAP.

2.3 FIELD SAMPLING CREW COORDINATOR

The Field Sampling Crew Coordinator is responsible for:

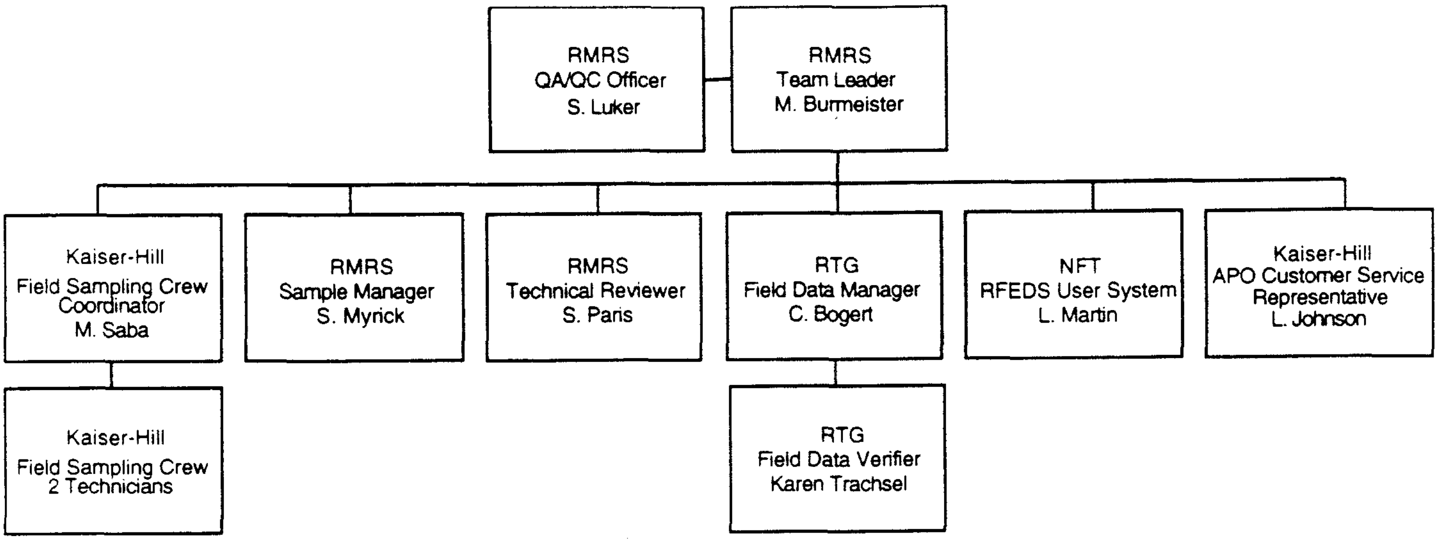
- Scheduling the Field Sampling Crew;
- Delivering copies of field data forms and COCs to the Sample Manager by the following day;
- Provide any technical advice and leadership to the Sample Crew; and
- Resolving any discrepancies with the Field Sampling Crew and clearly document any corrections, changes, or insertions on the appropriate forms.

2.4 FIELD SAMPLING CREW

The Field Sampling Crew will be responsible for sample collection, data collection concerning observation about samples and any field parameter analysis and data collection. Their tasks include:

- Preparation of the sample collection bottles according to information found on Sample Request Form;
- Complete all applicable entries onto appropriate forms (using black waterproof ink) and authenticating these forms;
- Complete the Chain of Custody for the samples;
- Complete and document any Field Parameters Analyses (pH, conductivity, nitrates, and ambient temperature) required by the Sample Request Form;
- Package and deliver the samples (along with the appropriate paperwork) to either Building 881 or the 559 Laboratory; and
- Complete entries into the APO sampling field notebook.

**FIGURE 2.0
SAMPLE MANAGEMENT
FUNCTIONAL ORGANIZATIONAL CHART**



2.5 SAMPLE MANAGER

The Sample Manager is responsible for:

- Coordination of sampling effort with APO Customer Service representatives; and
- Coordination of sampling effort with Field Sampling Crew Coordinator.

2.6 TECHNICAL REVIEWER

The Technical Reviewer performs a technical verification of the data, including:

- Reviewing field data to ensure consistency with known chemical and physical properties of the media being sampled;
- Verifying all calculations and reported units;
- Verifying that the correct number of QC samples were collected;
- Resolving any discrepancies with Sampling Crew Personnel and clearly recording any and all corrections, changes, or insertions made as a result of discrepancy resolution: and
- Ensuring that documentation for the verification of data in this record includes the date of verification and the initials of the verifier.

2.7 FIELD DATA MANAGER

The Field Data Manager is responsible for:

- Entering any relevant field parameters into the appropriate Datacap module;
- Entering the COC/tracking information into the Tracking section of Datacap within two days of sample shipment to the analytical laboratory;
- Printing data from Datacap and giving it to the Data Verifier for review;
- Verifying that all samples intended to be collected are in Datacap;
- Transmitting field information, sample collection data, and COC tracking data to the RFEDS USM; and
- Backing up and ensuring the security of Datacap.

2.8 FIELD DATA VERIFIER

The Field Data Verifier will compare the original field data forms and Datacap printout for consistency and accuracy, report any transcription errors, and return them to Data Entry for correction.

2.9 RFEDS USER SYSTEM MANAGER

The RFEDS User System Manager will perform the following:

Prior to sampling:

- Verify all locations of samples to be taken and assign any new location codes to sample locations;
- Assign sample numbers, COC numbers, and any applicable codes and abbreviations for the RMRS Team Leader; and
- Ensure laboratory data transfer compatibility to RFEDs.

After sampling, the RFEDS USM will:

- Verify any transmitted records for accuracy and completeness; and
- Ensure the data are preserved, retrievable, traceable, and available for response to regulatory agency requirements.

2.10 APO CUSTOMER SERVICE REPRESENTATIVE

The APO Customer Service Representative is responsible for:

- Coordination of sample analysis activities with analytical chemists; and
- Ensuring RFEDS uploading of analytical results.

3.0 DATA HANDLING SYSTEMS EQUIPMENT, DATA BACKUP, AND SECURITY PROCEDURES

3.1 IAG UST SOURCE REMOVAL PROJECT DATA HANDLING AND STORAGE SYSTEMS

The IAG UST Source Removal Project data handling and storage system will handle and store data including field data forms for the field instrumentation, such as FIDLER (field instrument for detection of low-energy radiation), laboratory screening data, and laboratory-generated data from RFEDS. The raw data will be manually input into Datacap, an interim database in Microsoft Excel, by the Team Leader, Project Data Manager, or designee. Datacap is a PC-run, temporary database used to store the field data in an easily retrievable and easily recognizable manner by the RFEDS database, ORACLE, to ensure completeness and accuracy prior to data transfer to RFEDS.

Datacap is able to generate appropriate reports and tables, provide systematic review, and efficient access and retrieval to optimize data use after downloading from RFEDS or manual input. It is recognized that different types of data (e.g., physical and chemical parameters, together with associated location information) from a variety of sources will be collected at various times.

The RFEDS data system is capable of managing fundamental sample data, reports, queries, and exports of the data. RFEDS is amenable to reporting either all or part of the data in selected fields. Furthermore, all or any subset of the data can be selected for review and analysis. RFEDS has the capability to export data to numerous personal computer applications such as Wordperfect, Autocad, Lotus, and Stratigraphics and can be transferred in ASCII, Microsoft Excel, or dBASE III-compatible file formats.

4.0 DOCUMENTATION

4.1 DOCUMENTATION OF FIELD ACTIVITIES

All field activities shall be documented by the RMRS Accelerated Actions Site Supervisor. The Site Supervisor shall be present at the site during all field activities. Activities shall be document in a field notebook according to Standard Operating Procedure 2-S47-ER-ADM-05.14, *Use of Field Log Books and Forms*.

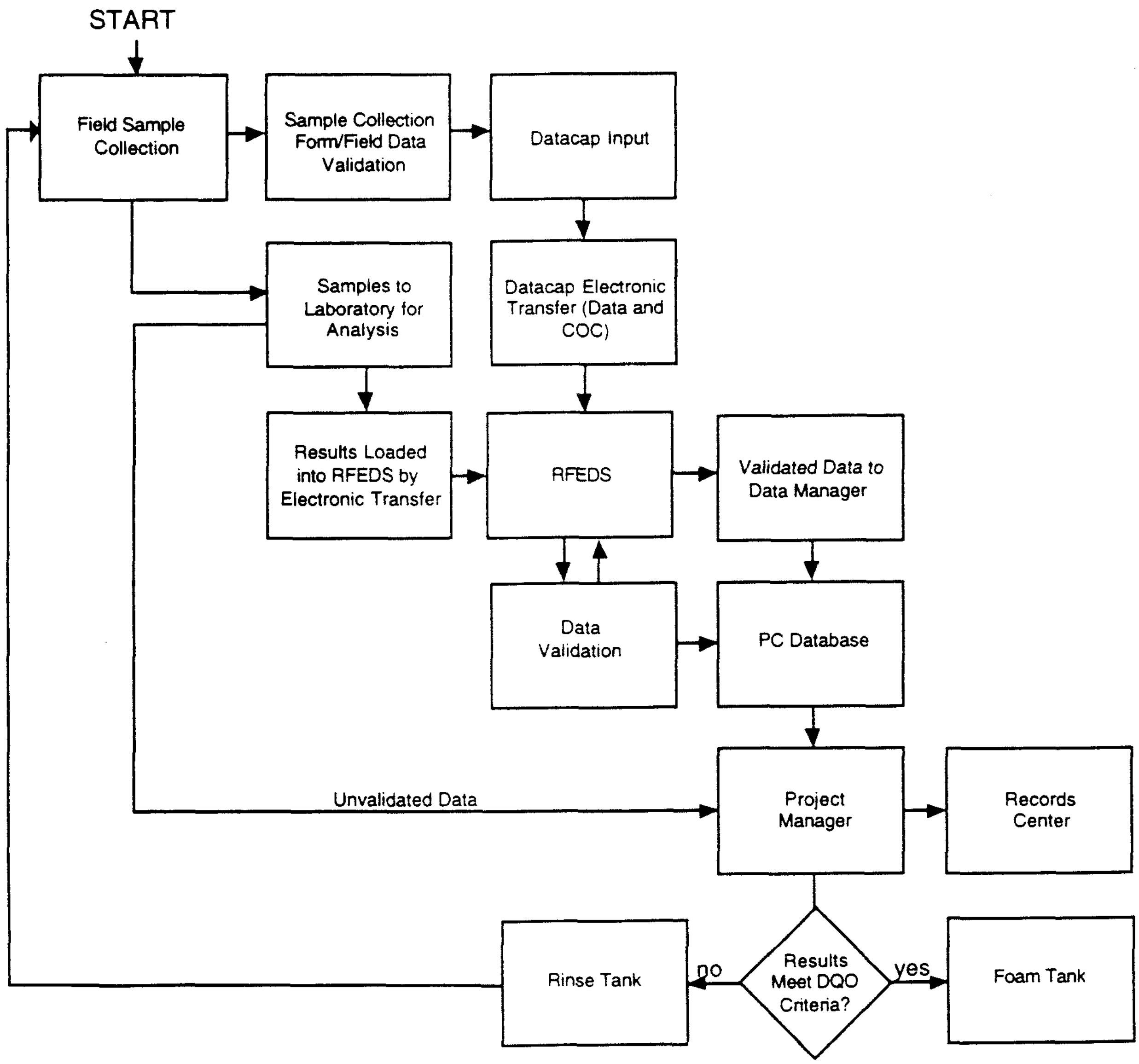
4.2 DOCUMENTATION OF SAMPLE COLLECTION ACTIVITIES

Sample collection activities will be documented by the Kaiser-Hill Field Sampling Crew members. The data will be documented according to the Standard Operating Procedure being used at the site. Two sampling procedures are applicable for this project: Procedure L-6245-F, *Sampling Procedure for Waste Characterization*, and Procedure L-6294-A, *Waste Characterization Sampling Procedures Inside the Protected Area*. Both procedures require documentation of sampling activities in the Records Section of the Procedure.

4.3 MANAGEMENT OF FIELD ACTIVITY AND SAMPLE COLLECTION DOCUMENTS

Documents and Forms generated in support of the IAG UST Source Removal Program shall be managed according to Standard Operating Procedure 2-S-65-ER-ADM-17.02, *Administrative Record Document Identification and Transmittal*. Figure 4-0 provides a flow chart of the overall field and analytical data programs.

FIGURE 4-0
DATA FLOW FOR ANALYTICAL DATA



RF/ER-96-0010

Interagency Agreement
Underground Storage Tank
Source Removal Program
Appendix B – Quality Assurance Addendum

Final

Rocky Mountain Remediation Services, L.L.C.

March 1996

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 PURPOSE

The purpose of the QAA is to identify QA requirements that are applicable to this removal action and to identify measures for implementing these requirements.

This QAA is intended to supplement the *Rocky Flats Environmental Technology Site Sitewide Quality Assurance Project Plan for Comprehensive Environmental Response Compensation Liability Act (CERCLA) Remedial Investigation/Feasibility Studies and RCRA Facility Investigations/Corrective Measures Studies Activities* (referred to as the RFP Site-Wide QAPjP, or simply QAPjP). As a supplement to the QAPjP, this QAA establishes the site-specific measures and QA controls applicable to the actions described in this SAP.

2.0 SCOPE

This QAA addresses all quality-related activities as described in the SAP to be performed by the Contractor of designated Subcontractor at RFETS.

The major actions within this SAP, to which this QAA applies, include:

- Definition of DQOs;
- Collection of field data;
- Sample collection and analysis;
- Quality control samples;
- Sample handling and shipping; and
- Data analysis.

3.0 BASIS FOR TECHNICAL ACTIVITY

The work outlined in the preceding SAP identifies the specific analytical needs, sampling requirements, data handling requirements and associated QA/QC requirements. This includes the completion of three main activities, which are as follows:

I. Sampling of sludges for waste characterization purposes;

II. Sampling of rinse waters (rinsates) generated during the rinsing of tanks; and

III. Sampling of rinsates generated from the final rinsing effort of the tanks.

4.0 QUALITY REQUIREMENTS

4.1 ORGANIZATION AND RESPONSIBILITIES

Rocky Mountain Remediation Services (RMRS) is responsible for the overall coordination of this sampling event. Other organizations such as the Analytical Projects Office and the Analytical Laboratory (internal or subcontracted) will be involved with this work. Responsibilities of other organizations will be assigned by RMRS.

An organization chart for this project is shown in Figure 4-1. The organization has been structured to maintain a high level of quality in all areas of work to be performed. Conformance to established requirements will be verified by individuals and groups not directly responsible for performing the work. RMRS is responsible for management and coordination of the resources dedicated to the project.

4.2 DESIGN CONTROL AND CONTROL OF SCIENTIFIC INVESTIGATIONS

4.2.1 Design Control

This SAP describes the general design considerations for implementing work activities, outlining sampling and analysis techniques, describing analytical requirements, and summarizing data management processes.

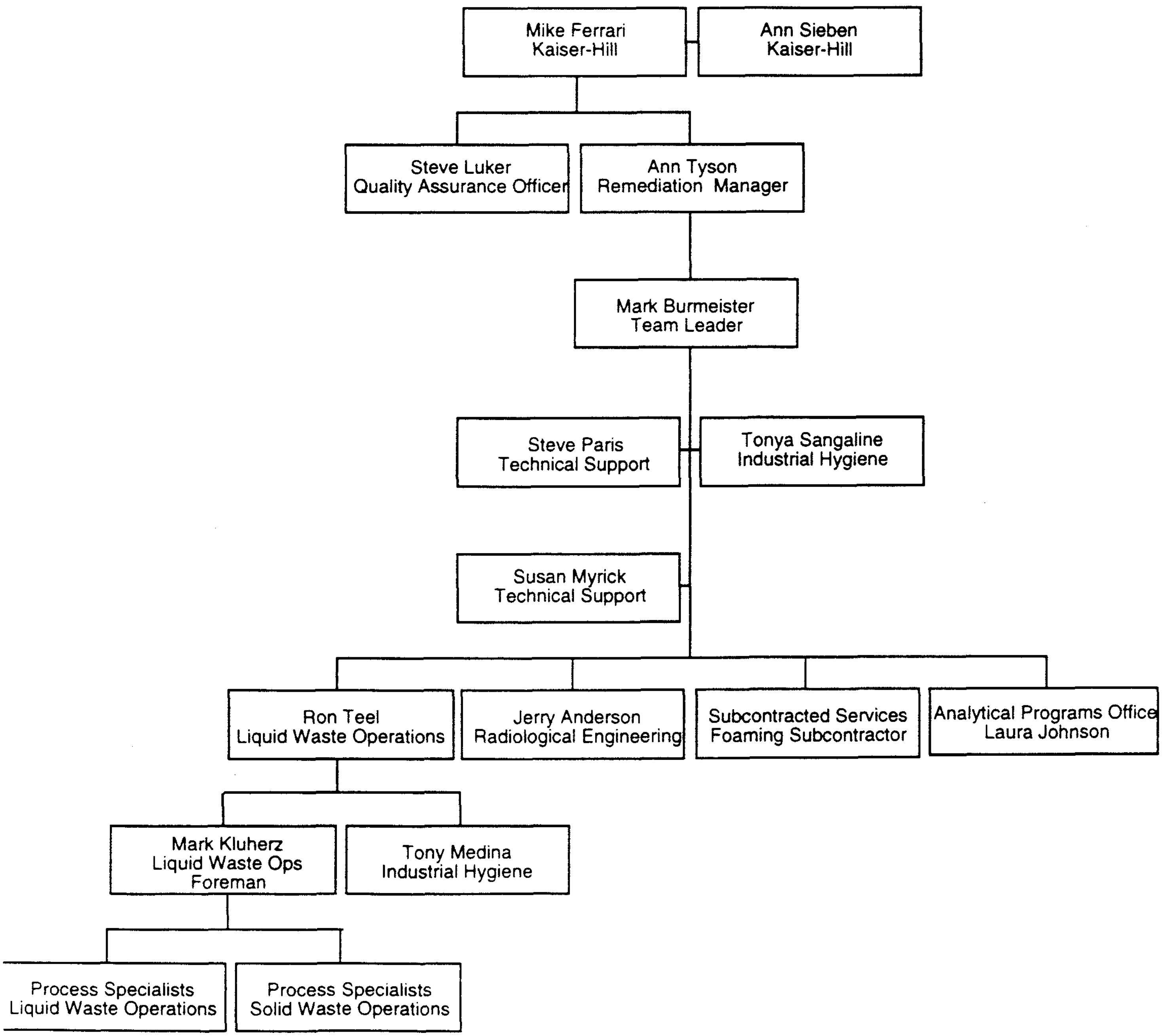
The QAPjP considers activities that generate analytical data, which requires collection and analysis of environmental samples to be scientific investigations. Controls for scientific investigations include:

- Developing DQOs;
- Collecting and analyzing samples according to approved procedures;
- Establishing and implementing quality controls; and
- Reducing and reporting data in a controlled manner.

4.2.2 Data Quality Objectives

DQOs quantitatively and qualitatively describe the uncertainty that decision-makers are willing to accept in results derived from environmental data. DQOs were established to make decisions on the number of samples required as specified in *Guidance for Planning for Data Collection in Support of Environmental Decision Making Using Data Quality Objective Process* (EPA QA/G4). Many of the seven steps in the DQO process have been used as a planning tool, and the results of the process are summarized below.

Figure 4-1
IAG Underground Storage Tank Source Removal Project Organizational Chart



State the Problem

(1) *Identify members of the planning team.* The planning team members include the Project Manager, the Accelerated Actions group's Team Leader, Environmental Safety, Health and Quality's Quality Assurance Officer, and a Liquid Waste Operations representative.

(2) *Identify the primary decision-maker.* There will be no primary decision maker; separate decisions will either be allocated to members of the planning team or made by consensus.

(3) *Develop a concise description of the problem.* The problem has been divided into the three activities that will be completed as part of the sampling activity. The problems are to:

I. Determine when rinse efforts are no longer effective in the removal of residuals in the tanks (<30% effective);

II. Determine the chemical composition of the rinsate generated from the final rinsing effort of the tank; and

III. Determine waste characterization of sludges generated from the removal action which have not been previously characterized.

(4) *Specify available resources and relevant deadlines for the study.* The removal actions must be completed in fiscal year (FY) 1996. The tank sources must be removed in FY 96 in order to obtain a specific performance measure. Cost is a factor on this project, and sampling cost must be kept at a minimum, while maintaining the necessary level of quality assurance/quality control.

Identify the Decision

(1) *State the decision(s).*

- Is the tank rinsing effort complete?
- What type of waste is the sludge generated from this effort?

(2) *State the actions that could result from the decision.*

Decisions made based on the sample results will be:

I. Has rinsing effort been effective (i.e., would additional efforts remove additional residual materials from the tank)?

a) Final rinsate sampling can begin at the tank.
b) Rinsing activities must continue until the residual are no longer mobilized.

II. Do the final rinsate water sample results confirm the rinsing process was effective in removing residual contamination to the extent possible by the method used?

a) Fill tank with closed-cell foam for interim closure pending clean closure.
b) Fill tank with closed-cell foam for interim closure pending closure as a landfill.

III. Is the waste a RCRA regulated, low-level radioactive, transuranic, mixed, or a solid waste?

a) The waste will be managed as a RCRA hazardous waste.
b) The waste will be managed as a low level waste.
c) The waste will be managed as a transuranic waste.
d) The waste will be managed as a mixed waste.
e) The waste will be managed as a solid waste.

Identify Input to the Decision

(1) *Identify the information that will be required to make a decision.*

I. To evaluate the condition of the tanks the planning team must determine if additional rinsing efforts will have any beneficial effect of removing residual material from the tanks. Indicator parameters, metals, VOCs, pH, conductivity, and volume results will be compare to previous rinsing efforts on a time series plot.

II. To evaluate the problem, the planning team must collect samples of the final rinsate to analyze for metals, VOAs, semi-VOAs, and radionuclides.

III. To evaluate the problem the planning team must collect samples from the waste and analyze for the characterization parameters.

(2) *Determine the sources of each item of information identified.*

I. The source of information will be analytical results from rinsate samples collected following rinsing efforts.

II. The source of information will be the analytical results from the rinsate sample collected following the final rinsate effort.

III. The source of information will be the analytical results from the sludge samples.

(3) *Identify the information that is need to establish the action level for the study.*

I. The action level for rinsing the tanks shall be as follows: After a minimum of three rinses, the results from selected indicator compounds from the metals sweep, VOC sweep, and radioactivity screen shall be within 30% of the previous sample results.

II. Action levels for the final rinsate samples – Action levels currently do not exist for the final rinsate samples.

III. The action levels will be:

a) The waste acceptance criteria for a permitted RCRA hazardous waste disposal facility.
b) The waste acceptance criteria for at a low level waste disposal facility.
c) The waste acceptance criteria for a transuranic waste disposal facility.
d) The waste acceptance criteria for a mixed waste disposal landfill.
e) The waste acceptance criteria for a sanitary landfill.

(4) *Confirm that appropriate field sampling techniques and analytical methods exist to provide the necessary data.*

I. Rinsate samples will be collected using procedure L-6245F, *Sample Procedures for Waste Characterization* or procedure L6294A, *Waste Characterization Sampling Procedure Inside the Protected Area.* Analytical methods will include ICPES metals, mercury, VOC, and a radioactivity screen. Analytical methods will be modified to meet DQOs of screening samples.

II. Final rinsate samples will be collected using procedure L-6245F, *Sample Procedures for Waste Characterization* or procedure L6294A, *Waste Characterization Sampling Procedure Inside the Protected Area.* Analytical methods include radioanalytical by gas proportional counting, EPA Method 8240 Target Compound List, Semi-VOCs by EPA Method 8270, and Method 6010, 7000, and 7470 for the Target Analyte List for metals.

III. Waste characterization samples will be collected using procedure L-6245F, *Sample Procedures for Waste Characterization* or procedure L6294A, *Waste Characterization Sampling Procedure Inside the Protected Area.* Analytical methods include radioanalytical by gas proportional counting, EPA Method 8240 Target Compound List, Semi-VOCs by EPA Method 8270, and Methods 6010, 6020, and 7000 series analyses for the Target Analyte List for metals.

Define the Boundaries of the Corrective Action

(1) *Define the spatial boundary of the decision.*

(a) Define the domain or geographic area within which all decisions must apply:

I. Decision will apply to the volume of rinsates generated during the rinsing of the tanks.

II. Decisions will apply to the volume of water generated from the final rinsing of the tank.

III. Decisions will apply to the volume of the waste containers.

(b) Specify the characteristics that define the population that will be studied:

I. Waters generated from rinsing the tanks.

II. Waters generated from the final rinse of the tank.

III. Sludges will be generated during the source removal process.

(c) Define the scale of decision making:

I. The scale of decision making will be based on the size of the tank.

II. The scale of decision making will be based on the size of the tank.

III. The scale of decision will be based on the number of waste containers generated during remedial activities.

(2) *Define the temporal boundary of the decision.*

(a) Determine when to collect data:

I. Rinsate samples will be collected following each complete rinsing of the tank, a minimum of three rinsate samples will be collected.

II. Final rinsate samples will be collected following the final rinse of the tank.

III. The sludge samples will be collected in the tanks or after all waste containers are filled.

(b) Determine the time frame in which the study data apply:

I. The sampling data will represent the quality of rinse water following each rinsing effort.

II. The sampling data will represent the quality of the final rinse water.

III. The sampling data will represent the results of sludge materials in the waste containers.

(3) Identify practical constraints on data collection:

I. Access to the tanks may be limited.

II. Access to the tanks may be limited.

III. Access to the tanks may be limited.

Develop a Decision Rule

(1) *Specify the parameter that characterizes the population of interest.*

I. VOC sweep results and metal sweep results will be used to determine the effectiveness of the rinsing effort.

II. VOCs, semi-VOCs, metals and radioactivity in the final rinse waters will be used to determine the condition of the tanks following the final rinse.

III. The concentration of RCRA constituents and radioactivity levels will be compared to waste disposal criteria for selected disposal facilities.

(2) *Specify the action level for the study.*

I. The action level for this decision is the analytical results from the third rinse are within 30% of the results from the second rinse.

II. The action level for this decision has not been determined.

III. The action level for this decision is the waste acceptance criteria for the selected waste disposal facility.

3) *Develop a decision rule.*

I. If the analytical results from the third rinse are greater than 30% of the second rinse, the tank will require an additional rinse effort until the 30% is achieved.

II. If the analytical results from the final rinsate sample support screening level results and indicate rinsing is no longer effective, the tank shall be filled with foam.

III.

a.) If RCRA constituents exceed TCLP threshold, the waste will be classified RCRA.
b.) If RCRA constituents do not exceed TCLP, the waste will be classified solid waste.
c.) If the radioanalytical results indicate radionuclides above background but less than 100nCi/l or 100nCi/g, the waste will be classified low level mixed waste.
d.) If the radioanalytical results indicate radionuclides above 100 nCi/l or 100 Ci/g, the waste will be classified transuranic.
e.) If RCRA and radioanalytical parameters are present in the waste, the waste will be classified low level mixed or TRU mixed waste.

Specify Acceptable Limits on the Decision Error

Sampling conducted under the IAG UST Source Removal Program is designed as a judgmental sampling program and not statistically based. Therefore, no hypothesis is being tested and limits on the decision error are not applicable.

Optimize the Design

There must be a high level of confidence that the data generated from samples collected in the field represent actual conditions. Data generated from the removal action will be compared to existing data and evaluated to determine if new data is representative.

Quality is also an accurate representation of the actual waste condition. This confidence level will be maintained by taking duplicate samples and equipment rinsates, ensuring the proper number of confirmation and waste container samples are collected, and by following the Precision, Accuracy, Representativeness, Comparability, and Completeness (PARCC) parameters as defined in Table 4-1.

4.2.3 Equipment Decontamination

Sampling equipment that is used at more than one location shall be decontaminated between sampling locations in accordance with Section 6.22, Equipment Decontamination, in Procedure L-6245-F, *Sampling Procedure for Waste Characterization*. The decontamination effort will be documented in accordance Section 8, Records of Procedure L-6245-F.

4.2.4 Quality Control

Field sampling quality control will be conducted for definitive sampling only (blank and final rinse samples) and consist of:

- Collection of field duplicate samples will be at a minimum of one per 20 samples or a minimum of one duplicate sample every three tanks.

- Preparation and analysis of an equipment rinsate blank for every 20 samples collected (at a minimum or at least one rinsate blank if 20 samples are not collected).

- Trip blanks for VOC analysis at a frequency of a VOC trip blank per shipment.

TABLE 4-1
PARCC PARAMETER SUMMARY

	Radionuclides	Analytical
Precision	Precision per GRRASP	RPD $\leq$ 20%* for liquid RPD $\leq$ 30%* for solid
Accuracy	Detection limits in GRRASP	Comparison of Lab Control Samples with real samples
Representativeness	Based on use of SOPs and Work Plans	Based on use of SOPs and Work Plans
Comparability	Based on use of SOPs and Work Plans	Based on use of SOPs and Work Plans
Completeness	90% usable 20% lab validation	90% usable 20% lab validation

*Relative percent difference

4.3 DOCUMENT CONTROL

Documents produced that control the work described in this Sampling and Analysis Plan will be "controlled" to ensure that key project personnel receive accurate and up-to-date information. Such documents will be controlled in accordance with Section 8.0 of Procedure L-6245, *Sampling Procedure for Waste Characterization*.

4.4 QUALITY VERIFICATION

The remaining quality elements of the project will be consistent with a graded approach of DOE Order 5700.6C.